

Faraday's Researches

metal, or rarefied air, or by means of points in common air, is still able to deflect the needle; the only requisite being, apparently, to allow time for its action: that it is, in fact, just as magnetic in every respect as a voltaic current, and that in this character therefore no distinction exists.

44. Imperfect conductors, as water, brine, acids, etc., etc., will be found far more convenient for exhibiting these effects than other modes of discharge, as by points or balls; for the former convert at once the charge of a powerful battery into a feeble spark discharge, or rather continuous current, and involve little or no risk of deranging the magnetism of the needles (30).

45. iii. *Chemical decomposition*.—The chemical action of voltaic electricity is characteristic of that agent, but not more characteristic than are the *laws* under which the bodies evolved by decomposition arrange themselves at the poles. Dr. Wollaston showed^x that common electricity resembled it in these effects, and "that they are both essentially the same;" but he mingled with his proofs an experiment having a resemblance, and nothing more, to a case of voltaic decomposition, which however he himself partly distinguished; and this has been more frequently referred to by some, on the one hand, to prove the occurrence of electro-chemical decomposition, like that of the pile, and by others to throw doubt upon the whole paper, than the more numerous and decisive experiments which he has detailed.

46. I take the liberty of describing briefly my results, and of thus adding my testimony to that of Dr. Wollaston on the identity of voltaic and common electricity as to chemical action, not only that I may facilitate the repetition of the experiments, but also lead to some new consequences respecting electro-chemical decomposition (112, 113).

47. I first repeated Wollaston's fourth experiment,² in which the ends of coated silver wires are immersed in a drop of sulphate of copper. By passing the electricity of the machine through such an arrangement, that end in the drop which

received the electricity became coated with metallic copper. One hundred turns of the machine produced an evident effect; two hundred turns a very sensible one. The decomposing action was however very feeble. Very little copper was precipitated., and no sensible trace of silver from the other pole appeared in the solution.

¹ *Philosophical Transactions*, 1801, pp. 427, 434.

Ibid. 1801, p. 429.